

Claims

1. Illumination unit, in particular for a projection system device or the like, comprising:

- 5 - at least one primary illumination light providing portion (10) being adapted for providing primary illumination light (L1),
- at least one secondary illumination light providing portion (30) being adapted for providing secondary illumination light (L2) derived from said primary illumination light (L1), and
- 10 - at least one light selecting element (20) being disposed between and assigned to said primary illumination light providing portion (10) and said secondary illumination light providing portion (30) and being simultaneously adapted to select one or a plurality of predefined spectral components or colors of one and/or of a plurality of predefined
- 15 polarization components from said primary illumination light (L1) and to thereby generate said secondary illumination light (L2) or a preform or a part thereof.

2. Illumination unit according to claim 1,

- 20 wherein said light selecting element (20) is provided with dichroic spectral selection properties or dichroic color selection properties, in particular in reflexion and/or in transmission of said primary illumination light (L1).

3. Illumination unit according to anyone of the preceding claims,

- 25 wherein said light selecting element (20) is provided with polarization selection properties and in particular with diffractive polarization selection properties, in particular in reflexion and/or in transmission of said primary illumination light (L1).

4. Illumination unit according to anyone of the preceding claims,

- 30 wherein said light selecting element (20) is or is adapted to work as a diffractive dichroic beam splitter.

5. Illumination unit according to anyone of the preceding claims,

- 35 wherein said light selecting element (20) is capable of reflecting or transmitting s-polarized components of inciding primary illumination light (L1) and/or of transmitting or reflecting p-polarized components of inciding primary illumination light (L1).

6. Illumination unit according to anyone of the preceding claims,
wherein said light selecting element (20) is capable of reflecting or transmitting
said predefined spectral components or colors of inciding primary illumination
5 light (L1) and/or of transmitting or reflecting complements of said predefined
spectral components or colors of said inciding primary illumination light (L1).

7. Illumination unit according to anyone of the preceding claims,
wherein said light selecting element (20) comprises a diffractive grating structure
10 (21) being adapted to act as a diffractive beam splitter device for incident
primary illumination light (L1) and in particular for at least one spectral range or
color thereof.

8. Illumination unit according to claim 7,
15 wherein said diffractive grating structure (21) comprises at least a grating bulk
material (21b), in particular having or forming a first or light incidence surface
(20a) or face.

9. Illumination unit according to claim 8,
20 wherein said grating bulk material (21b) is provided with an alternating sequence
of concave areas or recesses (21r) and convex areas or protrusions (21p), in
particular in or on said first or light incidence surface (20a) or face of said
grating bulk material (21b), so as to form grating line elements (22) of said
diffractive grating structure (21).

25 10. Illumination unit according to anyone of the claims 8 or 9,
wherein said grating bulk material (21b) is provided with a sequence of
embedded material portions, so as to form grating line elements (22) of said
diffractive grating structure (21).

30 11. Illumination unit according to anyone of the claims 9 or 10,
wherein said convex areas or protrusions (21p), said concave areas or recesses
(21r) and/or said embedded material portions are respectively essentially
identical, have a essentially linear extension and/or are disposed equally spaced
35 and parallely to each other.

12. Illumination unit according to anyone of the claims 9 to 11,
wherein said concave areas or recesses (21r) of said grating bulk material (21b)
and/or said embedded material portions are filled with a filling material.

5 13. Illumination unit according to claim 12,
wherein said filling material has a diffraction index which is different from a
diffraction index of said grating bulk material (21b).

14. Illumination unit according to anyone of the claims 8 to 13,
10 wherein said grating bulk material (21b) is or comprises a plurality of layers.

15. Illumination unit according to anyone of the preceding claims,
wherein said light selecting element (20) comprises a dichroic multilayer
structure (25) being adapted to act as a dichroic spectral filter device for incident
15 primary illumination light (L1).

16. Illumination unit according to claim 15,
wherein said dichroic multilayer structure (25) is or comprises an alternating
sequence of at least a first layer material (25-1) and a second layer material (25-
20 2), said first and second layer materials (25-1, 25-2) in particular having
different refraction indices (n_1 , n_2).

17. Illumination unit according to anyone of the claims 15 or 16,
wherein said dichroic multilayer structure (25) and/or said at least first and
25 second layer materials (25-1, 25-2) thereof extend essentially in the plane of said
first or light incidence surface (20a) or face, in particular parallelly thereto.

18. Illumination unit according to anyone of the claims 15 to 17,
wherein said dichroic multilayer structure (25) at least in part forms at least a
30 part of said grating bulk material (21b).

19. Illumination unit according to anyone of the claims 15 to 18,
wherein at least a part of said concave areas or recesses (21r), of said convex
areas or protrusions (21p) and/or of said embedded material portions (21e) are
35 formed in said dichroic multilayer structure (25).

List of Reference Signs

	1	Illumination unit
	10	Primary illumination light providing portion
5	20	Light selecting element, dichroic diffractive beam splitter
	20a	Light incidence surface
	20b	Opposite surface
	21	Diffractive grating structure
	21b	Grating bulk material
10	21p	Convex area, protrusion
	21r	Concave area, recess
	22	Grating line element
	25	Dichroic multilayer structure
	25-1	First layer material
15	25-2	Second layer material
	30	Secondary illumination light providing portion
	30'	Complementary secondary illumination light providing portion
	50	Prior art light selecting element, dichroic color filter, diffractive beam splitter
20	50a	First or light inciding face or surface
	50b	Opposite surface
	51	Diffractive grating structure
	51b	Substrate, bulk material
	51p	Convex area, protrusion
25	51r	Concave area, recess
	55	Multilayer structure
	55-1	First layer material
	55-2	Second layer material
	60	Deflection mirror
30	70	Diffractive polarizing beam splitter
	72	LCD-panel, light valve
	74	Diffractive analyzer, light valve
	80	Light mixing device
	100	Prior art illumination unit
35	n1	Diffraction index
	n2	Diffraction index
	B, B _s	Spectral component
	G, G _s	Spectral component

	L1	Primary illumination light
	L1'	Complementary primary illumination light
	L2	Secondary illumination light
	L2'	Second secondary illumination light
5	L2''	Third secondary illumination light
	N	Normal of light inciding face or surface
	R, R _s	Spectral component